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An Investigation of the Relationships Between the Teaching Climate, Students' Perceived Life Skills Development and Well-Being Within Physical Education

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Abstract

Background: Both education policies and curriculum documents identify the personal development of students as a key objective of modern education. Physical education in particular has been cited as a subject that can promote students' life skills development and psychological well-being. However, little research has investigated the processes by which physical education may be related to students' development of life skills and their psychological well-being.

Purpose: Using Benson and Saito's (2001) framework for youth development theory and research, this study explored the relationships between the teaching climate, students' perceived life skills development within physical education, and their psychological well-being.

Participants and setting: Participants were 294 British physical education students (M_{age} = 13.70, range = 11–18 years) attending six secondary schools in Scotland and England. On average, these male (n = 204) and female (n = 90) students took part in physical education classes for 2.35 hours per week.

Data collection: The data were collected via a survey which assessed perceived teacher autonomy support, participants' perceived life skills development within physical education (teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making), and their psychological well-being (self-esteem, positive affect, and satisfaction with life).

Data analyses: The preliminary analysis used descriptive statistics to assess how participants scored on each of the study variables and correlations to assess the relationships between all variables. The main analysis sought to test Benson and

Saito's (2001) framework using a series of mediation models which were tested via non-parametric bootstrapping analysis.

Findings: This study demonstrated that students perceived they were developing the following life skills through physical education: teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making. Overall, the results supported Benson and Saito's (2001) framework for youth development theory and research. In all analyses, perceived teacher autonomy support was positively related to participants' perceived life skills development within physical education and their psychological well-being. Participants' total life skills development was related to all three psychological well-being indicators – providing support for the 'pile-up' effect (Benson 2006). Total life skills development also mediated the relationships between perceived teacher autonomy support and participants' psychological well-being.

Conclusion: The findings suggest that perceived teacher autonomy support, along with total life skills development, are related to participants' psychological well-being. Interpretation of the results suggest that physical education teachers should integrate autonomy supportive behaviors into their teaching (e.g., provide choice in activities and encourage students to ask questions) as they are associated with young people's development of multiple life skills and their psychological well-being.

Keywords: positive youth development; personal and social development; developmental assets; psychosocial assets; transferrable skills.

Introduction

To maintain its valued position within education, it is necessary for physical education (PE) to highlight its 'educationally beneficial outcomes for students, across a range of domains' (Kirk 2013, 978). A beneficial outcome of PE, which has been highlighted by the United Kingdom Department of Education (2013), is students' personal development. Throughout the world, the personal development of students is seen as a key curricular aim of PE (Hardman 2011). Recently, personal development has been conceptualised in terms of the life skills young people may learn through PE (Goudas 2010). Life skills are defined as the skills that are required to deal with the demands and challenges of everyday life (Hodge and Danish 1999). Examples include teamwork, goal setting, leadership, and communication skills. Such life skills can been viewed as individual capital which enhance young people's educational attainment, quality of life, and future economic prosperity (Bailey et al. 2013).

PE has been proposed as an ideal setting for the development of life skills (Goudas 2010). Like youth sport, it is likely that the interactive, social, and emotional nature of PE provides opportunities for development (Danish et al. 2004; Hellison, Martinek, and Walsh 2008; Fraser-Thomas, Côté, and Deakin 2005). This view is supported by research which shows that young people do learn specific life skills through PE. For instance, qualitative research focusing on student-centred models of learning – such as the Sport Education Model and Cooperative Learning – has found that these forms of PE can teach students the following life skills: teamwork, communication, social skills, leadership, and problem solving and decision making (Dyson, Griffin, and Hastie 2004; Smither and Zhu 2011). Life skills programmes implemented within PE have also shown that students can learn goal setting and problem solving skills (Goudas and Giannoudis 2008). The present study focused on eight particular life skills: teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision

making. These are the most commonly cited life skills which young people are purported to learn through sport/PE (Johnston, Harwood, and Minniti 2013) and can be measured using Cronin and Allen's (2017) Life Skills Scale for Sport.

Learning individual life skills as well as multiple life skills is important for young people's development. In this regard, Benson (2006) suggested that the more strengths a young person possesses, the better off they will be on a variety of additional outcomes – this has been termed the 'pile-up' effect or hypothesis. An extensive review of the youth development research supports the idea of a 'pile-up' effect, with the total number of strengths young people possess being positively associated with academic, behavioural, and psychological outcomes (Scales et al. 2016). Such findings fit with the untested proposition that the more life skills or individual capital a young person accumulates through physical activity, the more likely they will develop positively (Bailey et al. 2013). Within the youth sport literature, a great deal of research involving participants, coaches, and parents has suggested that young people develop an array of life skills through their sports participation (see Johnston et al. 2013 and Holt et al. 2017 for review articles). Additionally, research has consistently shown that coaches can use a variety of strategies to help athletes develop their life skills (Pierce, Gould, and Camiré 2016). In contrast to youth sport, far less research has investigated life skills development within PE or the role teachers' play in students' life skills development. This is surprising given that PE – like youth sport – is another ideal setting for young people to develop their life skills (Goudas 2010).

Despite the importance of students' personal development within PE (United Kingdom Department of Education 2013), little is known about the antecedents or outcomes of life skills development within PE. Therefore, the present study investigated a mediation model whereby the teaching climate was related to students' life skills development; which, in turn, was related to their psychological well-being. This model tested Benson and Saito's

(2001) framework for youth development theory and research, which proposes that youth development inputs (e.g., the teaching climate) serve to develop young people's strengths (e.g., their life skills), and the development of these strengths helps promote young people's well-being. Benson and Saito (2001: 143) proposed this conceptual framework for youth development theory and research in order to 'guide the systematic inquiry necessary to guide, shape, refine, and fuel the [positive youth development] approach'. Using this framework, researchers can investigate the three key aspects of positive youth development: the developmental climate, life skills development, and well-being. More importantly, researchers can investigate the links between these three aspects of positive youth development. Benson and Saito's (2001) framework is similar to recently proposed models of positive youth development through sport (Holt et al. 2017) and life skills transfer from sport to other life domains (Pierce et al. 2016). Specifically, these models also propose that the developmental climate is related to participants' life skills development and, in turn, life skills development is related to other positive outcomes. The current study was the first to test such the framework within the context of PE.

Teacher Autonomy Support and Students' Perceived Life Skills Development

Within PE, the teacher plays a key role in young people's development (Bailey et al. 2013). The current study investigated if perceived teacher autonomy support was positively related to participants' life skills development. Autonomy support is part of self-determination theory (Ryan and Deci 2000) and refers to the PE teacher: adopting a student's perspective, providing choice in the activities, acknowledging students' feelings and perspectives, providing opportunities for initiative taking and independent work, and avoiding behaviours that seek to control students (DeMeyer et al. 2016). According to self-determination theory, taking part in any activity can have positive effects on people's development when combined with autonomy support (Ryan and Deci 2000); whereas, controlling behaviours can have

detrimental effects (Reeve, Deci, and Ryan 2004). Several studies have found that PE teacher autonomy support is related to a range of positive effects including greater student engagement (De Meyer et al. 2016), autonomous motivation (Standage and Gillison 2007), and leisure-time physical activity (Chatzisarantis and Hagger 2009). Thus, one would expect teacher autonomy support to be positively related to students' life skills development. Taking a self-determination theory perspective, Hodge, Danish, and Martin's (2013) conceptual framework for life skills interventions suggests that an autonomy supportive climate should satisfy needs for autonomy, competence, and relatedness; which, in turn, will lead to the development of life skills. Conversely, one would assume based on previous studies within PE (e.g., De Meyer et al. 2016) that a controlling climate and frustration of the needs for autonomy, competence, and relatedness would have negative effects on students' life skills development. Looking at life skills development from a "positive youth development" perspective, we chose only to assess autonomy support. Additionally, this study focused on the autonomy support aspect of self-determination theory as the primary objective of the study was to test Benson and Saito's (2001) framework for youth development theory and research – as opposed to fully testing the tenets of self-determination theory.

Previous studies have shown that autonomy support is related to a range of positive outcomes for young people. For instance, a study with British youth sport participants found that coach autonomy support was positively related to participants developing personal and social skills, cognitive skills, goal setting, and initiative (Cronin and Allen 2015). Interview-based research by Flett, Gould, Griffes, and Lauer (2013) found that effective American youth sport coaches use autonomy support to promote life skills development in their athletes. PE and sport studies have also shown that autonomy support is positively associated with young people's psychological well-being; namely, their self-esteem (Standage and Gillison 2007), positive affect and satisfaction with life (Smith, Ntoumanis, and Duda 2007).

Extending such research, the current study investigated whether perceived life skills development mediates the relationships between perceived autonomy support and students' psychological well-being – as suggested by Benson and Saito's (2001) framework for youth development.

Students' Perceived Life Skills Development and Their Psychological Well-Being

It is well-established that regular physical activity can have a positive effect on young people's psychological well-being (Bailey 2012). According to Benson and Saito's (2001) framework, the life skills young people learn through physical activity are positively related to their psychological well-being. Like previous research (e.g., Standage and Gillison 2007; Smith, Ntoumanis, and Duda 2007), the present study focused on the psychological well-being indicators of self-esteem, positive affect, and satisfaction with life. Self-esteem was defined as 'a person's evaluation of, or attitude toward, him- or herself' (Pyszczynski et al. 2004, 435); positive affect is 'the extent to which an individual experiences pleasurable engagement with the environment' (Crawford and Henry 2004, 246); and satisfaction with life was defined as 'a global assessment of a person's quality of life according to his/her chosen criteria' (Shin and Johnson 1978, 478).

Research with university students suggests that at least some of the eight life skills should be positively associated with these psychological well-being indicators. To begin with, goal attainment (Judge et al. 2005), time management (Bond and Feather 1988), emotional skills, social skills (Riggio, Throckmorton, and DePaola 1990), communication (McCroskey and Richmond 1990), and leadership (Bass 1990) have been positively related to students' self-esteem. Self-concordant goals – goals which are of interest and value to a person – (Sheldon and Elliot 1999) and emotional skills (Brackett and Mayer 2003) have been positively associated with students' positive affect. Lastly, goal attainment (Judge et al. 2005), emotional skills (Bastian, Burns, and Nettelbeck 2005), and social skills (Segrin and

Taylor 2007) have been positively related to students' life satisfaction. Research with 11–18 year old youth sport participants who took part in 38 different sports, has also shown that total life skills development and some individual life skills are related to participants' self-esteem, positive affect, and satisfaction with life (Cronin and Allen Preprint). Within PE, the present study was the first to test the relationships between students' perceived life skills development and their psychological well-being.

The Present Study

The overall purpose of this study was to examine if students perceived they were developing life skills through PE and investigate the antecedents and outcomes of life skills development. The first aim was to examine whether students were developing the eight life skills within PE. It was expected that participants would report developing these life skills, as previous studies have indicated that young people can learn these life skills when engaging in certain forms of PE (e.g., Dyson, Griffin, and Hastie 2004; Goudas and Giannoudis 2008; Smither and Zhu 2011). The second aim was to assess whether perceived autonomy support was positively related to each of the eight life skills. Based on the findings of previous youth sport studies (e.g., Cronin and Allen 2015; Flett et al. 2013), it was anticipated that this hypothesis would be supported. The third aim was to investigate whether developing each of the life skills – along with the range of life skills (i.e., the 'pile-up' effect) – was positively related to participants' self-esteem, positive affect, and satisfaction with life. Based on research in youth sport (Cronin and Allen Preprint), it was expected that total life skills development and some individual life skills would be related to each of the psychological well-being indicators. The final aim was to assess the proposition that students' perceived life skills development would mediate the relationships between perceived autonomy support and students' psychological well-being. Based on Benson and Saito's (2001) framework and research supporting the framework (Scales et al. 2016) – along with the propositions of

various models of youth development through sport (e.g., Holt et al. 2017; Pierce et al. 2016) – it was expected that this hypothesis would be supported.

Method

Participants

In total, a convenience sample of 294 British PE students (M_{age} = 13.70, *SD* = 1.52, age range = 11–18 years) completed measures of perceived teacher autonomy support, life skills development through PE, and psychological well-being. The sample comprised of male (*n* = 204) and female (*n* = 90) students drawn from six secondary schools in Scotland and England. Although the pedagogical approach of the teachers was not assessed, we believe that the PE context would have been indicative of the 'typical' PE teaching environment experienced by British students. These students took part in PE for an average of 2.35 hours per week (*SD* = .99). Within the sample, 37.4% of students took part in sport outside of PE, whereas 62.6% did not take part in sport outside of PE. Those that took part in sport participated in between 1–6 sports (M_{sports} = 1.33, *SD* = 1.21) for an average of 4.51 hours per week (*SD* = 3.49).

Procedures

Following approval from the university's ethics committee, PE students were recruited via local schools. Prior to students completing any surveys, informed consent was obtained from either the student (if > 16 years) or the student's parent or guardian (if < 16 years). Students completed the survey – which contained 80 questions in total – after the researcher gave a standardised introductory statement which explained the purpose of the study, that neither their name nor their teacher's name was required, there was no right or wrong answers, and all information would be confidential. The survey took approximately 15–20 minutes to complete.

Measures

Teacher Autonomy Support. Perceived autonomy support was assessed with a modified version of the 6-item Sport Climate Questionnaire (Deci 2001). In line with previous research (e.g., Standage and Gillison 2007), we amended items to target the PE context. Example items include 'I feel understood by my teacher' and 'My teacher listens to how I would like to do things.' Each item is rated on a 7-point scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The scale has previously displayed adequate reliability and validity within PE (Lim and Wang 2009). With the current sample, the scale displayed a reliability coefficient of .95, which is above the .70 criteria necessary for adequate reliability (Nunnally and Bernstein 1994).

Life Skills Development. The 43-item Life Skills Scale for Sport (Cronin and Allen 2017) was used to measure students' perceived life skills development through PE. The content validity, factorial validity, internal consistency reliability, and test-retest reliability of this scale was supported by Cronin and Allen (2017). As the measure was originally developed for youth sport, we adapted the scale by changing the item stem to 'PE classes have taught me to…' Example items include: *teamwork* (7 items; 'work well within a team/group'), *goal setting* (7 items; 'set challenging goals'), *time management* (4 items; 'manage my time well'), *emotional skills* (4 items; 'use my emotions to stay focused'), *interpersonal communication* (4 items; 'speak clearly to others'), *social skills* (5 items; 'get involved in group activities'), *leadership* (8 items; 'organise team/group members to work together'), and *problem solving and decision making* (4 items; 'think carefully about a problem'). Participants responded on a 5-point scale ranging from 1 (*Not at all*) to 5 (*Very much*). Each of the subscales and total life skills displayed adequate internal consistency reliability: teamwork (.87), goal setting (.93), time management (.92), emotional skills (.90), interpersonal communication (.87), social skills (.90), leadership (.93), problem solving and decision making (.91), and total life skills (.97).

As this was the first use of the LSSS within PE, it was important to assess the factor structure of the scale using confirmatory factor analysis (CFA), exploratory structural equation modelling (ESEM) and bifactor analysis. The following models were tested in Mplus (Version 7.4; Muthén and Muthén 1998–2015) based on the robust maximum likelihood (MLR) estimator: an eight-factor CFA model, a second-order CFA model, a first-order CFA model, a bifactor CFA model, an ESEM model, a higher-order ESEM model, and a bifactor ESEM model. For a complete description of the procedures used to test these models, see Appleton et al. (2016). Model fit was assessed using the χ^2/df ratio, RMSEA, CFI, and TLI values. A χ^2/df of less than 3.0 was indicative of adequate fit (Tabachnick and Fidell 2007). In line with Marsh, Hau, and Wen's (2004) recommendations, an RMSEA value of less than .08 or .05 represented a reasonable or close fit to the data respectively; whereas, CFI and TLI values greater than .90 or .95 indicated acceptable and excellent fit respectively. Competing models were compared using procedures outlined by Morin, Arens, and Marsh (2016). Similar fit is evident when changes are < .015 for the RMSEA, < .01 for CFI, and < .01 for TLI. Lower values for the Akaike Information Criteria (AIC), Bayesian Information Criterion (BIC), and sample size adjusted BIC (ABIC) are indicative of better model fit (Appleton et al. 2016). Full results from the testing of these models are contained within Tables A–E of the supplementary materials. The first-order CFA model was the only model to display a poor fit, which indicated that one overriding factor is not appropriate to represent all 43 life skills items. All other models displayed an adequate fit. Comparison of the fit indices, information criteria and correlations between subscales showed that the ESEM models best represented the data, as compared to the CFA models. The ESEM model and higher-order ESEM model provided the best representation of the data according to the fit indices, information criteria, and factor loadings. With the bifactor CFA and ESEM models, all items loaded significantly onto a general life skills factor, which indicated that the eight

subscales could also be combined to calculate a total life skills score. In sum, the statistical analyses provided evidence for the factorial validity of the LSSS within PE.

Self-esteem. Self-esteem was measured using the general-self subscale of the Self-Description Questionnaire II (Marsh, Parker, and Barnes 1985). Five items of the subscale are phrased positively (e.g., 'Most things I do, I do well') and five items are written to reflect low self-esteem (e.g., 'Overall, I am a failure'). Students responded on a scale ranging from 1 (*False*) to 7 (*True*). The reliability of this subscale has been supported with adolescents (Adie, Duda, and Ntoumanis 2010). The reliability coefficient was .84 for the current sample.

Positive Affect. Students' positive affect was assessed using the positive subscale of the Positive and Negative Affect Schedule (Watson, Clark, and Tellegen 1988). This 10-item scale asks participants to rate how a word (e.g., 'inspired' or 'active') describes their feelings 'in general.' Students rated the extent to which they feel that way on a scale ranging from 1 (*Very slightly or not at all*) to 5 (*Extremely*). This scale has displayed adequate reliability and factorial validity with adolescents (Crocker 1997). With the current sample, the scale displayed a reliability coefficient of .93.

Satisfaction With Life. Satisfaction with life was measured using the Satisfaction With Life Scale (Diener et al. 1985). This 5-item scale asks participants to indicate their agreement with certain statements (e.g., 'I am satisfied with life'). Students responded on a scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). This scale has displayed adequate factorial validity and reliability with adolescents (Pons et al. 2000). The reliability coefficient was .85 for the current sample.

Analysis Strategy

The mediation hypotheses were tested for all three dependent variables: self-esteem, positive affect, and satisfaction with life. As traditional statistical techniques to test for mediation

suffer from problems including low statistical power, a lack of quantification of the intervening effect, and the inability to test multiple mediators simultaneously (Hayes 2009), we employed non-parametric bootstrapping analysis (Hayes 2013). This analysis allows for an estimation of direct and indirect effects in models with multiple mediators and performs better than other techniques in terms of statistical power and Type I error control (Hayes 2009). To test each model we used the PROCESS macro for SPSS (Hayes 2013) with 20,000 bootstrap resamples and 95% bias corrected confidence interval (CIs). There is evidence of mediation, or a specific indirect effect, when zero is not included within the lower and upper bound CIs. Previous studies have investigated mediational models using the same approach (e.g., Felton and Jowett 2013).

Results

Preliminary Analysis

In line with Tabachnick and Fidell's (2007) recommendations, the data was screened for missing responses, multivariate and univariate outliers, and a normal distribution. Within the original sample (N = 296), of the 74 items each individual item was left blank an average of 4.00 times across the whole sample (SD = 1.33; range = 0–12). Data analysis revealed no pattern to these missing values, rather the data was missing at random. As the percentage of missing data was low (1.5%) and we wanted to minimise lost data, a mean substitution was performed. To assess for univariate outliers, standardized z-scores and 3.29 as the critical value were used. For multivariate outliers, mahalanobis distances and the critical value of χ^2 (13) = 34.53 ($p < .001$) were used. No univariate but two multivariate outliers were found and deleted from the sample – leaving a final sample of 294 PE students. Regarding the distribution of the data, skewness values ranged from -0.71 to 0.01 and kurtosis values ranged from -1.08 to 0.47, indicating reasonable normality (Tabachnick and Fidell 2007).

Descriptive Statistics

Table 1 presents the means, scale ranges, standard deviations, reliability coefficients, and correlations for all variables [Table 1 near here]. The mean score for perceived teacher autonomy support was 4.80 on the 1–7 scale, indicating that participants felt their PE teacher was displaying moderate levels of autonomy supportive behaviors. Mean scores on the 1–5 response scale of the LSSS revealed that participants felt they were developing 'some' (3 on the response scale) life skills through PE. The mean scores from highest to lowest were: teamwork (3.50), interpersonal communication (3.35), social skills (3.29), leadership (3.22), goal setting (3.09), time management (3.00), problem solving and decision making (2.95), and emotional skills (2.79). Mean scores for the psychological well-being indicators were: 4.22 on the 1–6 scale for self-esteem, 3.52 on the 1–5 scale for positive affect, and 5.03 on the 1–7 scale for satisfaction with life. Such scores meant that participants scored quite high for each of the psychological well-being indicators. Overall, the correlations between perceived autonomy support and all of the life skills (*r* range = .41–.53) and psychological well-being indicators (*r* range = .15–.46) were significant and positive. Each of the eight life skills and total life skills were positively associated with positive affect (*r* range = .49–.65) and satisfaction with life (*r* range = .13–.28). However, only teamwork, goal setting, leadership and total life skills were positively related to self-esteem (*r* range = .16–.24).

Main Analyses

Figure 1 displays unstandardized regression coefficients for each of the mediation models [Figure 1 near here]. Within the mediational models, we controlled for evident gender and age group differences (see supplementary materials for details of these differences). In all models, perceived teacher autonomy support was included as the independent variable. Teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making were included as parallel mediators. Model A included self-esteem as the dependent

variable, Model B had positive affect as the dependent variable, and Model C included satisfaction with life as the dependent variable. Results of the indirect effects are presented in Table 2. This table tells us whether there is a total indirect effect and what effect, if any, each of the mediators are having. The total indirect effect also represents the indirect effect of total life skills as it is the sum of the indirect effects for each mediator. Lastly, Figure 2 displays the mediation model when total life skills were included as a sole mediator.

The mediational models in Figure 1 showed that perceived autonomy support was positively associated with all eight mediators: teamwork ($\beta = .21$, $p < .001$), goal setting ($\beta = .25$, $p < .001$), time management ($\beta = .34$, $p < .001$), emotional skills ($\beta = .32$, $p < .001$), interpersonal communication ($\beta = .32$, $p < .001$), social skills ($\beta = .26$, $p = .001$), leadership ($\beta = .31$, $p < .001$), and problem solving and decision making ($\beta = .29$, $p < .001$). However, consistent relationships were not seen between each of the life skills and the psychological well-being indicators. Only teamwork ($\beta = .28$, $p = .009$) was positively related to self-esteem; teamwork ($\beta = .21$, $p = .007$) and leadership ($\beta = .19$, $p = .014$) were positively associated with positive affect; and only time management ($\beta = .29$, $p = .004$) was positively related to satisfaction with life.

The first model included self-esteem as the dependent variable (Figure 1, Model A). For this model, the total effect of perceived autonomy support on self-esteem was significant ($\beta = .13$, $p < .001$). When the mediators were entered into the model, the direct effect of perceived autonomy support on self-esteem was reduced and non-significant ($\beta = .07$, $p = .090$), suggesting full mediation. Of the proposed mediators (see Table 2) only teamwork displayed a significant indirect effect, $\beta = .06$, $p = .013$, 95% CI = [.02, .11] [Table 2 near here].

The second model had positive affect as the dependent variable (Figure 1, Model B). With this model, the total effect of perceived autonomy support on positive affect was

significant (β = .27, $p < .001$). When the mediators were entered into the model, the direct effect of perceived autonomy support on positive affect was still significant (β = .08, p = .010) although reduced, suggesting partial mediation. Of the proposed mediators (see Table 2), teamwork, β = .04, p = .010, 95% CI = [.01, .09] and leadership, β = .06, p = .018, 95% CI = [.01, .12], displayed significant indirect effects.

The third model included satisfaction with life as the dependent variable (Figure 1, Model C). For this model, the total effect of perceived autonomy support on satisfaction with life was significant (β = .21, $p < .001$). When the mediators were entered into the model, the direct effect of perceived autonomy support on satisfaction with life was reduced and non-significant (β = .09, p = .089), suggesting full mediation. Of the proposed mediators (see Table 2) only time management displayed a significant indirect effect, β = .10, p = .007, 95% CI = [.04, 17].

Finally, we analysed three models which had total life skills as the sole mediator (Figure 2, Models A–C) [Figure 2 near here]. These models showed that perceived autonomy support was positively associated with total life skills (β = .28, $p < .001$). Additionally, total life skills were positively related to self-esteem (β = .19, p = .013), positive affect (β = .64, $p < .001$), and satisfaction with life (β = .38, $p < .001$). For all models, when total life skills was entered as a mediator, the direct effect of perceived autonomy support on the psychological well-being indicators was reduced. Furthermore, the results from Table 2 indicate a total indirect effect (which represents total life skills) for each of the models: self-esteem, β = .06, 95% CI = [.01, .11]; positive affect, β = .19, 95% CI = [.14, .25]; and satisfaction with life, β = .12, 95% CI = [.04, .21]. Combined, these results tell us that total life skills mediated the relationships between perceived autonomy support and participants' psychological well-being.

Discussion

The purpose of this study was to examine if students are developing life skills through PE and explore the antecedents and outcomes of life skills development. Like the research from youth sport (e.g., Johnston et al. 2013; Cronin and Allen Preprint), the present study found that students perceive they are developing the following life skills through PE: teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making. As personal development is a key curricular aim of PE (Hardman 2011), it was encouraging that students felt they were developing life skills through PE to 'some' extent (3 on the 1–5 response scale). Using a reliable and valid measure, this was the first study to show quantitatively that young people perceive they are developing these eight life skills through PE. To corroborate such findings, future research could gain multiple perspectives (i.e., teachers or parents) on whether young people have developed these life skills or create behavioral ratings scales to assess the life skills (Goudas 2010).

Similar to research in youth sport (e.g., Cronin and Allen 2015; Flett et al. 2013), this study found that perceived autonomy support was positively related to participants' life skills development. In practical terms, this suggests that teachers should display the following autonomy supportive behaviors within their classes: provide choice and options in the activities, convey confidence in students' abilities to do well, listen to how students would like to do things, and encourage students to ask questions. Given that autonomy support forms only one aspect of self-determination theory (Ryan and Deci 2000), future PE studies focused on self-determination theory could investigate the mechanisms by which development occurs using the LSSS as an outcome measure. For example, the following causal sequence suggested by Van den Berghe et al. (2014) could be investigated: need support in PE – student need satisfaction – self-determined motivation – outcomes from PE (i.e., life skills development). Such a causal sequence fits well with

Hodge et al.'s (2013) framework for life skills interventions, which is based on self-determination theory.

Along with perceived teacher autonomy support, it is plausible that other factors account for students developing their life skills through PE. Specifically, it is possible that the teacher's approach to PE impacts upon whether the students develop certain life skills. For instance, a teacher that encourages students to coach one another on the techniques of a sport may promote students' leadership and communication skills. It is also probable that the development of some life skills is an indirect result of taking part in PE. For example, students may enhance their social skills through interacting with their peers before, during and after PE classes. Another interesting question is whether teachers are explicitly teaching life skills (e.g. directly teaching goal setting skills) or are they deliberately shaping activities and instruction to foster life skills (e.g., implementing the Sport Education Model to foster teamwork skills). Future research using the LSSS alongside observational or interview-based approaches could examine some of these suggestions which may account for students developing their life skills through PE. In particular, the impact of certain pedagogical models (e.g., the Sport Education Model and Cooperative Learning) on students' life skills development could be investigated. Taking advantage of the strengths of quantitative and qualitative research methods, future studies would provide a clearer picture of the mechanisms through which students develop their life skills within PE.

In their framework for youth development theory and research, Benson and Saito (2001) proposed that the life skills young people develop are related to other well-being outcomes. For individual life skills, the mediation models in this study suggested this was not the case for all life skills. Only the development of teamwork skills was positively associated with students' self-esteem; teamwork and leadership skills were positively related to students' positive affect; and only time management was positively associated

with students' satisfaction with life. In contrast to individual life skills, total life skills development was positively related to students' self-esteem, positive affect, and satisfaction with life. This finding supports Benson's (2006) proposed 'pile-up' effect and Bailey et al.'s (2013) untested proposition that the accumulation of human capital allows young people to develop positively. Based on these findings, researchers and practitioners should advise PE teachers to develop a range of life skills in their students. In practice, teachers could focus on different life skills at specific times during a particular PE class. For instance, the beginning of a class could be used to teach students to set goals for the session; whereas, the end of class could be used to allow students to communicate their thoughts on how the session went.

Within their framework, Benson and Saito's (2001) also suggested that life skills development would mediate the relationship between teacher autonomy support and participants' psychological well-being. Like other PE and sport studies (e.g., Smith, Duda, and Ntoumanis 2007; Standage and Gillison 2007), this study showed a direct relationship between perceived autonomy support and each of the psychological well-being indicators. Findings also showed that individual life skills had only a small mediation effect on these relationships. In contrast to individual life skills, total life skills did consistently mediate the relationships between perceived autonomy support and students' psychological well-being. Again, this clearly highlights the importance of teachers attempting to develop multiple life skills in their students.

Like any study, the present study had a number of limitations which need to be discussed. With self-report data there is always a concern with social desirability and the truthfulness of responses. Therefore, future studies could gain others' perspectives on students' life skills development through PE (e.g., parents or teachers). As all data was collected at one time-point, common method bias could also be a cause for concern.

According to Podsakoff et al. (2003), different response formats for the independent, mediator and dependent variables should have reduced possible common method bias. Future studies could reduce possible common method bias further by obtaining the independent and dependent variables from different sources, measuring independent and dependent variables in different contexts, or by introducing a time-lag between measuring the independent and dependent variables (Podsakoff et al. 2003). Another limitation was that only 90 female students took part in the study. Future research should target an even gender split and further investigate some of the gender differences highlighted in the supplementary materials. A final limitation was the correlational nature of this study, which means that causality could not be established between variables. Future longitudinal or experimental studies should investigate the causal relationships between the teaching climate, students' life skills development, and psychological well-being.

Conclusion

In summary, the present study provided a unique contribution to the literature by demonstrating that students develop the following life skills through PE: teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making. Findings showed that perceived autonomy support was positively related to the development of all eight life skills and total life skills were positively related to the three psychological well-being indicators. These findings supported Benson and Saito's (2001) framework for youth development theory and research within the context of PE. In practice, the results of this study suggest that PE teachers should create an autonomy supportive climate to promote students' life skills development and psychological well-being.

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Table 1

Summary of Intercorrelations, Scale Ranges, Mean Scores, Standard Deviation, and Reliability Coefficients

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Autonomy support	–												
2. Teamwork	.45***	–											
3. Goal Setting	.41***	.65***	–										
4. Time management	.49***	.57***	.68***	–									
5. Emotional skills	.44***	.45***	.56***	.67***	–								
6. Communication	.50***	.57***	.53***	.66***	.63***	–							
7. Social skills	.41***	.63***	.59***	.59***	.63***	.64***	–						
8. Leadership	.53***	.68***	.65***	.71***	.66***	.73***	.74***	–					
9. Problem solving	.45***	.61***	.65***	.69***	.69***	.62***	.66***	.75***	–				
10. Total life skills	.56***	.79***	.82***	.83***	.79***	.80***	.83***	.90***	.85***	–			
11. Self-esteem	.15*	.24***	.19**	.07	.06	.11	.11	.17**	.08	.16**	–		
12. Positive affect	.46***	.56***	.52***	.54***	.49***	.54***	.52***	.61***	.52***	.65***	.43***	–	
13. Life satisfaction	.22***	.27***	.20**	.26***	.13*	.20***	.23***	.28***	.19**	.27***	.32***	.36***	–
Scale range	1–7	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–5	1–6	1–5	1–7
Mean score	4.80	3.50	3.09	3.00	2.79	3.35	3.29	3.22	2.95	3.18	4.22	3.52	5.03
Standard deviation	1.54	.77	1.02	1.18	1.22	1.08	1.07	.97	1.07	.85	.97	.90	1.27
Cronbach's Alpha	.95	.87	.93	.92	.90	.87	.90	.93	.91	.97	.84	.93	.85

Note. $N = 294$.

*$p < .05$, **$p < .01$, ***$p < .001$

Table 2
Indirect Effects of Teacher Autonomy Support on Psychological Well-being (Self-esteem, Positive Affect and Satisfaction With Life) Through Each Mediator

	Bootstrap effect	Normal effect	Normal theory tests			95% CI
			SE	*z*	*p*	
Self-esteem						
Total effect	.06					[.01, .11]
Teamwork	.06	.06	.02	2.48	.01	[.02, .11]
Goal setting	.04	.04	.02	1.67	.09	[-.005, .08]
Time management	-.02	-.02	.03	-0.73	.47	[-.07, .03]
Emotional skills	-.01	-.01	.02	-0.57	.57	[-.06, .03]
Communication	.00	.00	.03	0.08	.93	[-.05, .05]
Social skills	.00	.00	.02	-0.05	.96	[-.04, .04]
Leadership	.04	.04	.03	1.26	.21	[-.03, .12]
Problem solving	-.05	-.05	.03	-1.91	.06	[-.11, -.004]
Model	$F(3, 288) = 10.70^{***}$, $R^2 = .10$					
Positive affect						
Total effect	.19					[.14, .25]
Teamwork	.04	.04	.02	2.57	.01	[.01, .09]
Goal setting	.01	.01	.02	0.83	.41	[-.02, .05]
Time management	.03	.03	.02	1.65	.10	[-.002 .07]
Emotional skills	.01	.01	.02	0.67	.50	[-.02, .05]
Communication	.03	.03	.02	1.35	.18	[-.02, .07]
Social skills	.02	.02	.02	0.97	.33	[-.02, .05]
Leadership	.06	.06	.03	2.37	.02	[.01, .12]
Problem solving	-.01	-.01	.02	-0.69	.49	[-.05, .02]
Model	$F(3, 288) = 31.35^{***}$, $R^2 = .25$					
Satisfaction with life						
Total effect	.12					[.04, .21]
Teamwork	.04	.04	.03	1.41	.16	[-.01, .11]
Goal setting	-.02	-.02	.03	-0.83	.41	[-.09, .03]
Time management	.10	.09	.04	2.72	.01	[.04, .17]
Emotional skills	-.06	-.06	.03	-1.87	.06	[-.13, .02]
Communication	-.02	-.02	.03	-0.45	.65	[-.09, .05]
Social skills	.04	.04	.03	1.55	.12	[-.01, .10]
Leadership	.06	.06	.05	1.34	.18	[-.04, .16]
Problem solving	-.04	-.04	.03	-1.08	.28	[-.11, .03]
Model	$F(3, 288) = 9.00^{***}$, $R^2 = .09$					

Note. $N = 292$. Bootstrap generated confidence intervals. CI = confidence interval. Both gender and age group were entered as covariates in all three models. Two participants were omitted from the analyses as they did not provide their age.
$^{***}p < .001$

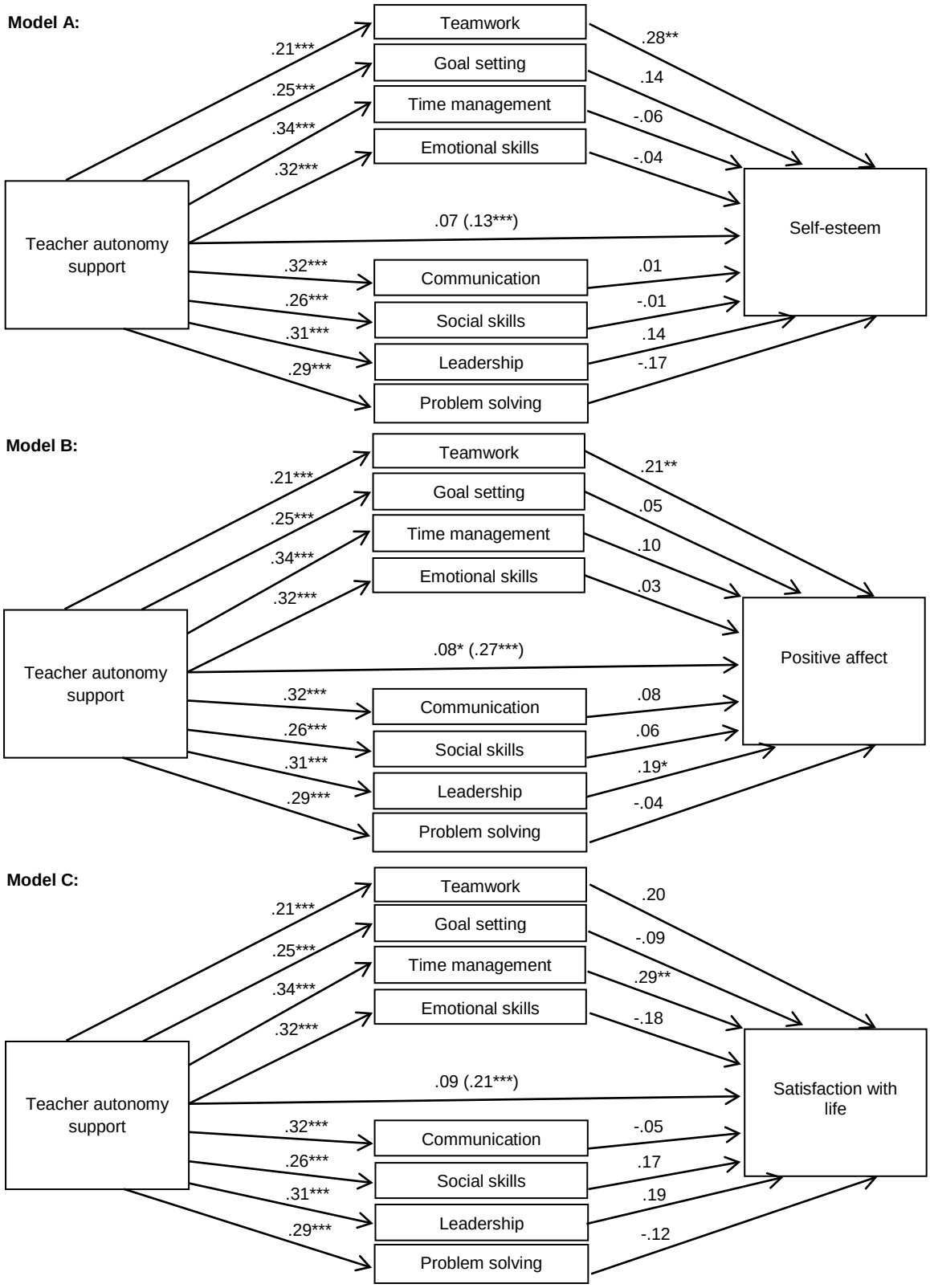
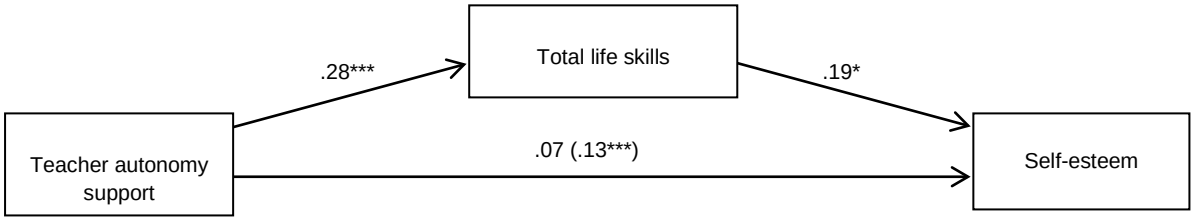


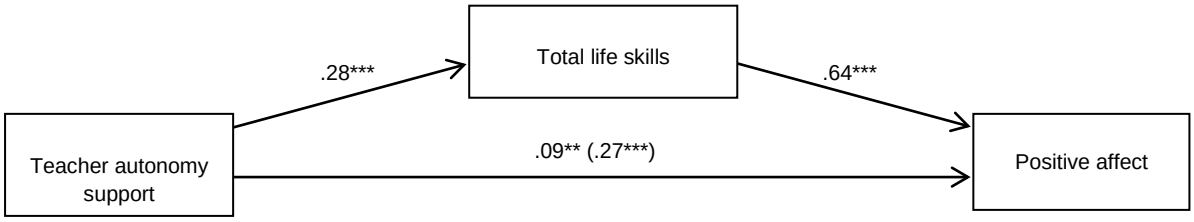
Figure 1. Regression models predicting self-esteem (Model A), positive affect (Model B), and satisfaction with life (Model C). Values signify unstandardized regression coefficients. The direct effect of teacher autonomy support on each indicator of psychological well-being are outside the parentheses. The total effects are inside the parentheses. Both gender and age group were included as covariates in all three models.

*p < .05, **p < .01, ***p < .001.

Model A:



Model B:



Model C:

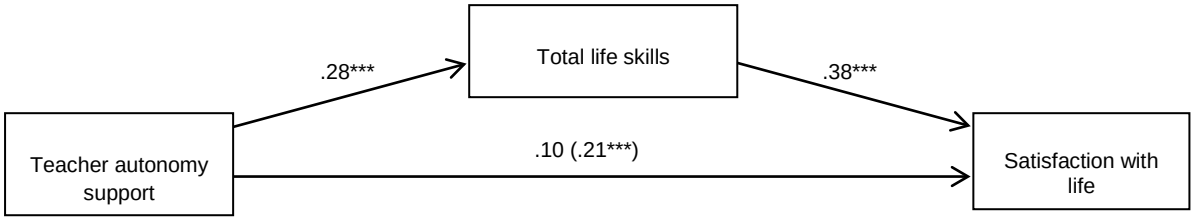


Figure 2. Regression models predicting self-esteem (Model A), positive affect (Model B), and satisfaction with life (Model C). Values signify unstandardized regression coefficients. The direct effect of teacher autonomy support on each indicator of psychological well-being is outside parentheses. The total effects are inside parentheses. Both gender and age group were included as covariates in all three models.

**$p < .01$, ***$p < .001$.